

REMARKS

The Office Action dated May 10, 2010 has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

In accordance with the foregoing, the claims 1, 2, 4, 6, 9, and 10 have been amended to more particularly point out and distinctly claim the subject matter of the invention. No new matter is being presented, and approval and entry are respectfully requested. Support for the amended features in the claims may be found throughout the specification and drawings. The joint (1 and 2) is at an end of the link, which is supported at page 9, lines 21 to 23, of the specification. As will be discussed below, it is also requested that all of claims 1-10 be found allowable as reciting patentable subject matter.

Claims 1-4, 6, and 8-10 stand rejected and claims 5 and 7 are allowed.

REJECTION UNDER 35 U.S.C. § 112:

In the Office Action, claims 1-4, 6, and 8-10 were rejected under 35 U.S.C. § 112, second paragraph, for indefiniteness.

In response, the claims have been amended to more particularly point out and distinctly claim the invention.

Accordingly, it is respectfully requested that the § 112, second paragraph rejections to the claims be withdrawn.

REJECTION UNDER 35 U.S.C. § 102:

Claims 1-4, 6, and 8-10 were rejected under 35 U.S.C. §103(a) as being allegedly unpatentable as obvious over U.S. Patent No. 4,300,362 of Lande *et al.* (“Lande”) in view of U.S. Patent No. 5,797,900 of Madhani *et al.* (“Madhani”). The Office Action took the position that Lande discloses all of the features of claim 1, except that the first and second motor have output shafts orthogonal to the link. The Office Action cited Madhani to remedy this deficiency of Lande. It is respectfully asserted that, for at least the reasons provided herein below, Lande and Madhani, individually or combined, fail to teach or suggest the recitations of the pending claims. Reconsideration is requested.

Independent claim 1, upon which claims 2-4, 6, and 9 are dependent, recites a A joint structure to be connected to an assembly and a link of a robot, the joint structure includes a first motor in the link, and a second motor in the link. The joint structure also includes a joint at an end of the link configured to cause the assembly to swing in a longitudinal motion with respect to the link with a power from the first motor and cause the assembly to swing in a lateral motion with respect to the link with a power from the second motor. The first motor and the second motor are disposed so that a rotation output shaft of the first motor and a rotation output shaft of the second motor are parallel with each other and are orthogonal to the link.

As will be discussed below, Lande and Madhani fail to disclose or suggest the elements of any of the presently pending claims.

Lande generally relates to articulation for a manipulator arm. The embodiment shown in Figure 4 of Lande appears to have two jacks 13B and 13C that can articulate disk 35 both with a lateral motion and a longitudinal motion, respectively.

The Office Action appears to have treated jacks 13B and 13C as motors and attempted to make them correspond to the claimed “first motor” and “second motor” respectively. However, as explained at column lines 49-58 of Lande, jacks 13B and 13C are not motors, but instead are hydraulic jacks. Thus, contrary to the Office Action, Lande does not and cannot disclose “a first motor in the link,” and “a second motor in the link,” as recited in amended independent claim 1.

Additionally, as the Office Action acknowledged, Lande fails to disclose that jacks 13B and 13C have rotation output shafts orthogonal to a link to which they are connected. In addition, Lande fails to teach or suggest, “a joint at an end of the link configured to cause the assembly to swing in a longitudinal motion with respect to the link with a power from the first motor and cause the assembly to swing in a lateral motion with respect to the link with a power from the second motor,” as recited in amended independent claim 1. There is no teaching or suggestion in Lande of a joint at an end of the link to cause the manipulator arm to swing in a longitudinal motion with respect to the link with a power from the jack 13B and cause the manipulator arm to swing in a

lateral motion with respect to the link with a power from the jack 13C. Lande does not contemplate such configuration.

Amended independent claim 1, also recites in part, “the first motor and the second motor are disposed so that a rotation output shaft of the first motor and a rotation output shaft of the second motor are parallel with each other and are orthogonal to the link.”

In the Office Action, it is argued that the hydraulic jack of Lande could be substituted with the motor to impart a force to a device, in this case, it appears that the examiner meant the joint structure of the robot. However, now further clarified with the amended features in independent claim 1, a person of ordinary skill in the art would not substitute hydraulic jacks with the first and second motors of claim 1 to enable a swing in a longitudinal and lateral motions with respect to a link. In principle, a hydraulic jack is a jack that uses a liquid to push against a piston. Hydraulic jacks have six main parts. These are the reservoir, pump, check valve, main cylinder, piston, and release valve. The reservoir holds hydraulic fluid. A pump will draw the fluid up and then create pressure on the down stroke as it pushes the fluid through the check valve. This valve allows the fluid to leave the reservoir and enter the main cylinder. In the main cylinder, the piston is forced up as the cylinder is filled with the fluid. When it is time to release the pressure and allow the piston to return to its starting position, the release valve is opened. This allows the fluid to return to the reservoir. A motor, in this instance, would be converting electricity into mechanical motion.

A person of ordinary skill in the art would appreciate at least two big deficiencies in using a pair of hydraulic jacks rather than the first and second motors. First, the precision in swinging the assembly in a longitudinal motion and a lateral motion with respect to the link. Such precision cannot be accomplished with the rudimentary approach of Lande by using a pair of hydraulic jacks to move an arm. It must be kept in mind that the application of the configuration of Lande is to move an arm to operate a tool, such as a spray gun. Precision is not required for the manipulation arm of Lande to operate for its intended purpose. Second, the use of first and second motors in amended independent claim 1 enables to have a clean and efficient configuration to operate the robot's assembly. In contrast, Lande offers a pair of hydraulic jacks that operate using hydraulic fluid. Therefore, contrary to the contentions made in the Office Action, a person of ordinary skill in the relevant art would appreciate all the deficiencies involved in using a pair of hydraulic jacks and would not be motivated to use such jacks instead of motors.

The Office Action cited Madhani to remedy this deficiency of Lande. Madhani generally relates to a wrist mechanism for a surgical instrument for performing minimally invasive surgery with enhanced dexterity. In Madhani, there are no motors or hydraulic jacks at the wrist joint. Madhani, however, does employ five motors M1-M5 (see Figure 3). The motors (M1-M5) include several motors whose output shafts (see, for example, Figure 4, drive shaft capstan 93) are parallel to one another and orthogonal to the link to which they are apparently attached.

There appears to be no particular reason why one of ordinary skill in the art would seek to combine the feature of the arrangement of the motors in Madhani with the disclosure of Lande to arrive at something corresponding to what is recited in amended independent claim 1. In particular, a combination of Lande and Madhani would fail to teach or suggest, “a first motor in the link; a second motor in the link; and a joint at an end of the link configured to cause the assembly to swing in a longitudinal motion with respect to the link with a power from the first motor and cause the assembly to swing in a lateral motion with respect to the link with a power from the second motor,” as recited in amended independent claim 1.

In the Response to Arguments section, page 7, the Office Action submits “[r]egarding applicant’s argument as to the placement of the motors, there is no limitation in the claims as to the *location of the motors within the device as the position related to the joint*, and thus the claim fails to limit the *placement of the motor within the device*.” (Emphasis added) Although original claim 1 provided enough features to specify the location of the motors within the device, independent claim 1 has been amended to further clarify the position of these motors. Amended independent claim 1 specifically recites that “the joint structure comprising:... a first motor in the link; a second motor in the link; and a joint at an end of the link configured to cause the assembly to swing in a longitudinal motion with respect to the link with a power from the first motor and cause the assembly to swing in a lateral motion with respect to the link with a power from the second motor.” Amended independent claim 1 recites that the first and the second

motors are part of the joint structure, that the first motor and the second motors are parallel with each other, and that the first and the second motors are orthogonal to the link.

Even if the motors of Madhani's were substituted with the jacks of Lande, the substituted motors in Lande would be not located at the joint. Thus, if Madhani's motors were somehow substituted for Lande's hydraulic jacks, there is no reason one of ordinary skill in the art would follow Madhani's placement of the motors (as to being orthogonal to the link) while ignoring Madhani's placement of the motors as to the displacement from the joint. Likewise, if one of ordinary skill in the art were following Madhani's use of motors, there is no obvious reason for one of ordinary skill not also to follow the joint mechanism that Madhani provides, which does not involve a first motor moving the joint in a longitudinal direction and a second motor moving the joint in a latitudinal direction.

Accordingly, for the reasons set forth above, we recommend requesting that the rejection of claim 1 be withdrawn.

Independent claim 10 has its own scope, recite features similar to those recited in amended independent claim 1. For at least the reasons discussed above, Applicants respectfully submit that Lande and Madhani fails to disclose or suggest all of the features of claims 1 and 10 and related dependent claims. Accordingly, Applicant respectfully requests that the rejection of claims 1 and 10 and related dependent claims be withdrawn.

Reconsideration and allowance of claims 1 and 8 are, thus, respectfully requested.

Claims 3 and 8 were rejected under 35 U.S.C. §103(a) as being allegedly unpatentable as obvious over Lande in view of Madhani, as applied to claims 1-2, and further in view of U.S. Patent No. 5,732,599 of Iriyama (“Iriyama”). The Office Action took the position that the combination of Lande and Madhani discloses most of the features of the claims, but cited Iriyama to remedy deficiencies of the combination of Lande and Madhani with respect to “an elastic member configured to generate a force between the movable cover and at least one of the assembly and the robot link, and place the moveable cover in a predetermined position.” It is respectfully asserted that, for at least the reasons provided herein below, Lande, Madhani, and Iriyama, individually or combined, fail to teach or suggest the recitations of the pending claims. Reconsideration is requested.

Claims 3 and 8 depend on claim 1. At least some of the deficiencies of the combination of Lande and Madhani with respect to claim 1 are discussed above. Iriyama does not remedy the above-identified deficiencies of the combination of Lande and Madhani.

Iriyama generally relates to an industrial robot. However, there is nothing in Iriyama that would have led one of ordinary skill in the art to arrive at the claimed invention in which “the joint structure comprising:... a first motor in the link; a second motor in the link; and a joint at an end of the link configured to cause the assembly to swing in a longitudinal motion with respect to the link with a power from the first motor and cause the assembly to swing in a lateral motion with respect to the link with a power

from the second motor,” as recited in amended independent claim 1. A combination of Lande, Madhani, and Iriyama would fail to teach or suggest that the first and the second motors are part of the joint structure, that the first motor and the second motors are parallel with each other, and that the first and the second motors are orthogonal to the link as recited in amended independent claim 1. Thus, the combination of Lande, Madhani, and Iriyama fails to disclose or suggest all of the elements of any of the presently pending claims.

For at least the reasons discussed above, Applicants respectfully submit that Lande, Madhani, and Iriyama fails to disclose or suggest all of the features of claim 1 and related dependent claims 3 and 8. Accordingly, Applicant respectfully requests that the rejection of dependent claims 3 and 8 be withdrawn.

CONCLUSION:

In view of the above, Applicants respectfully submit that the claimed invention recites subject matter which is neither disclosed nor suggested in the cited prior art. Applicants further submit that the subject matter is more than sufficient to render the claimed invention unobvious to a person of skill in the art. Applicants therefore respectfully request that each of claims 1-4, 6, and 8-10 be found allowable and, along with allowed claims 5 and 7, this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the Applicants' undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the Applicants respectfully petition for an appropriate extension of time.

Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,

/Alicia M. Choi/

Alicia M. Choi
Attorney for Applicants
Registration No. 46,621

Customer No. 32294
SQUIRE, SANDERS & DEMPSEY L.L.P.
14th Floor
8000 Towers Crescent Drive
Vienna, Virginia 22182-6212
Telephone: 703-720-7800
Fax: 703-720-7802

AMC:dk